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AUTHOR Whelan, Sister Mariellen
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ABSTRACT

This study focused on the Instructor-Group Interaction Scale, formulated by Hildebrand, Wilson, and Dienst (1971), to explore the feasibility and usefulness of an instrument for recording instructor-group interaction in the college classroom. It was hypothesized that data from the scale would (a) provide the instructor with the pattern of classroom interaction; (b) explore the relationship between an observer's categorizing of interaction and the students' evaluation of the interaction; and (c) determine the correlation between the students' evaluation of the instructor's interaction and the overall evaluation of theinstructor. Three professors were observed in a total of eight sessions. Their verbal patterns were assessed every 3 seconds on a 17 category observation form. The data compiled from this form were placed in eight matrixes which were presented in the appendix. The student evaluation form consisted of 36 items which ranked on a seven point scale. The results revealed that the matrix was a valuable instrument for some professors but a refinement of the 17 categories was indicated. Analysis of the student evaluation form offered only tentative conclusions. Four tables of statistical data were presented. (BRB)

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Several studies have been done in recent years to identify the characteristics of good teaching at the College level. Thistlethwaite (1960) found differences among teachers in different major fields with respect to the characteristics students felt contributed most to their desire to learn. (Feldman and Newcomb, p. 273). Riley, Ryan and Lifshitz (1950) in a survey of the student body at Brooklyn College found the qualities thought essential for effective instruction varied considerably with the discipline. Solomon (1966) in a study of teacher behavioral qualities notes

> ... of teacher behavior have not yet discovered a stable and consistent set of behavorial dimensions, patterns, or styles to relate to the effective promotion of learning. While certain similarities and convergences can be found... inconclusive and contradictory results are still more typical. (in Magoon, A.J. and J.R. Price. "Rating Dimensions of Course and Instruction Characteristics: The Eye of the Beholder", 1972).

The Magoon and Price study (1972) suggests that student evaluation of instructors reflect students' organization of attributes rather than raters' perceptions of a course or instructor. Their hypothesis emerged from an analysis of the pattern of deviation about the mean, patterns too clearly defined to attribute to error.

The exploratory study described in this paper is the outcome of reflection on the Hildebrand, Wilson and Dienst (1971) research identifying the components of effective teaching at the University level, and the body of research on instructor-group interaction, Withall(1949, Flanders (1960), Furst (1965), Hough and Ober (1966). Hildebrand, Wilson and Dienst surveyed more than 1600 students and faculty over a three year period, asking students to describe the teaching of those identified by them as the best teachers and as the worst teachers, and asking faculty to identify a best and a worst teacher among their colleagues. A follow-up validation study was done a year later with 1015 respondents answering questions about the teaching of a given instructor. The classes included those of instructors identified as best, as worst and not previously identified as either

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in the earlier survey. The study indicated high agreement among the student groups and between the students and the faculty about the effectiveness of teaching. Unlike the Thistlethwaite and the Riley, Ryan and Lifshitz studies, the Hildebrand, Wilson and Dienst study identified characteristics common to best teachers in all disciplines.

Scales characterizing effective teaching as perceived by students were established by factor analysis. These included Analytic Synthetic Approach, Organization and Clarity, Instructor-Group Interaction, Instructor-Individual Student Interaction, and Dynamism and Enthusiasm.

> Scale 1. Analytic Synthetic approach- relates to scholarship, with emphasis on breadth, analytic ability, and conceptual understanding.
>
> Scale 2. Organization/Clarity- relates to skill at presentation, but is subject related, not student related, and not concerned merely with rhetorical skill.
>
> Scale 3. Instructor-Group Interaction- relates to rapport with class as a whole, sensitivity to class response, and skill at securing active class participation.
>
> Scale 4. Instructor-Individual Student Interaction- relates to mutual respect and rapport between the instructor and the individual student.
>
> Scale 5. Dynamism/Enthusiasm- relates to flair and infectious enthusiasm that comes with confidence, excitement for the subject, and pleasure in teaching.
>
> (Hildebrand, Wilson, Dienst, p. 18)

The study described here focused on the Inatructor-Group Interaction scale to explore the feasibility and the usefulness of an instrument for recording instructor-group interaction in the college classroom to provide the instructor with data on the pattern of classroom interaction; to explore the relationship between an observer's categorizing of interaction and the students' evaluation of the interaction; and to determine whether there is a correlation between the students' evaluation of the instructor's interaction and their overall evaluation of the instructor.

Procedure

Flanders' Interaction Analysis categories were supplemented with seven components from the Hildebrand, Wilson, Dienst Scale 3, Instructor- Group Interaction. Only those components which could be demonstrated verbally were used, thus category 21, "has interest and concern in the quality of his teaching", was omitted. The observation form consisted of the following seventeen categories:

1. Accepts feelings
2. Praises or encourages
3. Accepts or uses ideas of students
4. Asks questions
5. Lecturing
6. Giving directions
7. Criticizing or justifying authority
8. Student talk-limited
9. Student talk- divergent
10. Silence or confusion
11. Encourages class discussion
12. Invites students to share knowledge or experiences
13. Clarifies thinking by identifying reasons for questions
14. Invites criticism of his own ideas
15. Indicates awareness that class is confused
16. Indicates awareness that class is bored
17. Has students apply concepts to demonstrate understanding

Categories 1-10 are Flanders, categories 11-17 are adapted from Hildebrand, Wilson and Dienst.

This instrument was used to assess the Instructor- Group interaction by recording every three seconds the number of the category that best described the verbal pattern at that moment. Three Rosemont College Professors were observed in a total of 8 class sessions, four of one Professor, three of a second Professor, amd one of a third Professor. A matrix was constructed to illustrate the recorded data and to summarize the patterns of interaction. Table I.

A student evaluation form drawn from the Hildebrand study consisting of 36 items to be ranked on a 7 point scale was administered to the students in the classes where the observer recorded the interaction. Appendix A. This was a modification of the Berkeley medium length form (Hildebrand, Wilson, Dienst, p. 40) and included items 11-17 from the observation form, as well as 7 components of effective teaching from each of the other 4 scales, Analytic-Synthetic Approach, Organization and Clarity, Instructor-Individual Student Interaction, and Dynamism/Enthusiasm. These were tabulated, a mean for each scale for each professor was calculated , as well as a total mean on the 36 items. The mean of the Interaction -Group Scale (3) for each professor was compared with his overall mean and with the highest mean of his five scales.

The print out of the observation matrices were discussed with the professors to ascertain the value of this recording of interaction data to the individual professor.

Results

Matrices A-1, A-2, A-3, A-4, in Table I, show the pattern of interaction in the four classes observed of Professor A. A color system has been devised and used to simplify interpretation of the matrix so the instructor can read the significant facts with a minimum of instruction.

Color key:

Orange- The cells with orange shading indicate extended use of the same category, for example, long periods of lecture, 5-5, long questioning, 4-4, long student divergent response 9-9. All other cells are transition cells; they indicate the beginning or ending of particular student or instructor behavior.

Yellow- These cells indicate the instructor response to student statements. A 10 in the cell of the 9th row, 3rd column, indicates that in 10 instances the instructor followed a student statement with acceptance of student ideas.

Green - These cells indicate the verbal behaviors that led out of lecture.

Purple- These cells indicate the verbal behaviors that led into lecture.

Blue- These cells indicate the behavior that preceded student participation.

Red - Boxed Area - This is an area of instructor-group interaction, a combination of encouragement of discussion, student response and silence.

In Matrices A-1, A-2, A-3 and A-4, the primary pattern starts in cell 5-5, steady state of lecture, 5-4 lecture to question, 4-4 continued development of the question, and then 4-9, student divergent reponse to the question, or, as in Matrix A-4, 4-10, a period of silence after the question. The student response is generally extended, 9-9, and followed by 9-3, acceptance of student ideas, or, as in A-3, 9-5, back into the pattern of lecture. When student response is followed by acceptance of student ideas, 9-3, as in A-1, A-2, and A-4, this is extended in the 3-3 cell in Matrices A-1 and A-2 and followed by 3-5, a move into lecture. Some interpreters consider a cell significant for identifying a pattern, only if it has 10% or more of the

total tallies. If this rule is applied to Matrices A-1, A-2, A-3 and A-4, the only significant pattern is lecture, 5-5.

Matrices B-1, B-2 and B-3 show the pattern of interaction observed in the classes of Professor B. The predominant pattern is lecture 5-5, with questions leading out of lecture, 5-4, these questions are usually extended, 4-4, and followed by student limited response, 4-8. On Matrices B-2 and B-3, the student response is usually followed by acceptance of student ideas, while on Matrix B-1, the more significant pattern is student divergent response 4-9, which is extended, 9-9, and followed by further questions from the instructor or praise and encouragement. If the 10% rule is applied to Matrices B-1, B-2 and B-3, the only significant pattern is lecture.

Matrix C-1 shows the pattern of interaction observed in the class of Professor C. It illustrates two patterns, one, lecture, 5-5, the other, an interaction in the 9-9, 9-10, 10-9, cells. This illustrates a pattern of student discussion. A tally was made in the 10 cell each time a student speaker changed. The 10-9 cell with 50 tallies and the 9-10 cell with 41 tallies can be interpreted as an estimate of the student-student dynamic. The instructor's role at this time is seen in the 9-2 cell, praise and encouragement, with 57 instances of this which generally led into further student discussion, 2-9 cell, with 40 instances. C-1 is a distinctly different pattern of instructor-group interaction with 41% of the time in lecture and 44% of the time in student discussion. Because it was not possible to obtain more

than one observation for this instructor, the instructor was asked whether each of his classes usually had a period of student discussion and a period of lecture. The Instructor said this is the way he plans his work.

Table II is a comparioson of the three professors on the proportion of class time spent in each of the 17 verbal behavior categories.

The Matrices for Inatructor A and for Inatructor C were reviewed with the Instructors to determine whether the recording of the interaction dynamic was of any value to the instructor to analyze his teaching. In both instances the instructors found in the matrices elements of interest and of surprise. Instructor A expressed distress at the high percentage of lecture and the minimal use of categories 11-17. He commented that if these categories were significant components of good teaching at the college level, that the hours spent in preparation for a class would focus less on getting on top of the material than on how to present the material using these categories. He found the information in the matrix more valuable than the evaluative instruments his students have used in the past. He raised a question about category 16- recognizes class is bored- how it would be manifested verbally.

Instructor C whose matrix showed 41% lecture, 44% student talk, was surprised at what he considered a high percentage for lecture. He was surprised and encouraged with the 9-10, 10-9 dynamic, and pointed to the need for a sociogram or other instrument to determine the pattern of student interaction. He expressed concern with having 'struck out' in category 14- invites criticism of his own ideas.

The second step of the study was to determine what evaluation the students give to each professor on the five evaluation scales in order to explore the relationship between the matrices and the students' evaluation; and to determine whether there is a difference between the students' evaluation of the instructor's interaction and the composite evaluation of the five scales. The evaluation form in Appendix A was used.

27 students responded in Professor A's classes, 16 in Professor B's classes and 8 in Professor C's classes. The number of students responding is lower than expected and desired, but could not be controlled because the forms were not available until after all Seniors were no longer attedning class.

Means for each item were calculated, Table III, and averaged to determine a grand mean. The items were put into the five scales, Table IV, and means for each scale calculated. A t test was used to test the significance of the difference between the mean for the Group-Interaction Scale (3) and the grand mean for each instructor. These differences were not significant. A t test was used to test the significance of the difference between the mean of each instructor's lowest scale, which for instructors A and B was the Group Interaction Scale (3) and the mean of the instructors highest scale, which for both instructors A and B was Dynamism/Enthusiasm (5). For both instructor A and Instructor B the difference in means for the highest and lowest scale on the student evaluation is significant at the .05 level. Table V. There is no significant difference between any of the means of the scales for instructor C, nor is there a significant difference between his mean on Scale 3 and that of instructor A.

Discussion and Conclusions

This limited exposure of the matrix in the college classroom indicates that an instrument is of value at this level for some instructors. The matrix needs more exposure with a diversity of instructors and subject matter to test out and refine the 17 category system. This brief use has indicated that a break down of the lecture category migth be beneficial - a break down that would distinguish giving of information from examples or illustrations. As Professor A pointed out Category 16- recognizes class is bored- would be more likely a non-verbal shift , than an articulation that would be recorded asv verbal behavior. Hence, 16 should probably be eliminated.

This study suggests that one observation is an adequate representation of the usual teaching style of a given instructor and that unless there were conditions in each course that elicited significantly different verbal patterns , an initial single observation would provide enough data for an instructor to analyze the verbal patterns in his classes. This could be followed up if the professor wanted to see whether he had successfully modified a particular pattern or patterns.

The analysis of the student evaluation forms leads to several tantative conculsions:

1. Student evaluation forms are less valuable for analyzing and improving teaching than an instrument which objectively records the teaching process.

2. Student evaluation forms reveal little discrimination of the degree to which an instructor demonstrates various components of teaching within scales and between scales. This evidence leads me to support the thesis of Magoon and Price that students have preconceived notions of what characteristics of courses and instructors

correlate, and which do not. (Magoon and Price, Paper presented at American Educational Research Association, April, 1972, p. 4)

3. The significance of the difference between the mean of the highest scale and the mean of the lowest scale for both Instructors A and B is important; it is the only indication that the student evaluation concurs with the objective evidence of the matrix. Though neither instructor was rated below average on Instructor-Group Interaction, both groups of students do evaluate the Dynamism/ Enthusiasm significantly higher. The fact that there are no significant differences in the means of the five scales for Professor C supports this to some extent. His evaluation is quite even.

4. The non-discriminatory nature of the student evaluations is also supported in Professor C's very even evaluation. Though the matrix indicates a very high percentage of student talk and student interaction, which, I would hypothesize, is unusual on this campus, these students have not identified that as exceptional.

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Instructor A-1
Class HUMANITIES
Date 4-21-72

MATRIX

TABLE I

CATEGORY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
1	4				7			11	1									
2		11			7			11	1									
3			5	6	2			1	2		2							
4				34	5			3	4	7	3		1	1				
5				17	18			1	1	4			1	1	1			
6					7	11		11	1									
7					7		4	1	1									
8					2			1	1									
9			10	2	1				1	4	4	2						
10			2	2	4			1	6	3	3			1				
11				1	1			1	7	3	4		1					
12					1			1	1			1						
13					3			1	1			5						
14					2			1	1				1					
15					1			1	1					2				
16					1			1	1						1			
17					1			1	1							1		
Total Tallies			17	12	1252			4	147	46	53		34	4	4			1653
Incidents			12	28	19			3	20	20	12		4	3	2			
Percent of Total	0	0	.1	3.8	77.4	0	0	.2	8.9	2.8	3.2	0	2.1	.2	.2	0	0	

Instructor A-2
Class HUMANITIES
Date 4-21-72

MATRIX

TABLE I

CATEGORY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
1	1				1			2							1			
2		2			1			2										
3			12		5			1	2		1				1		1	
4				17	11			4	11	3					1		1	
5	1		1	18	15			1	6	5			2	1				
6					1	1		2										
7					1		1	2										
8			1		3			6	1								1	
9			10	8	3				31	1	9		1					
10				1	6			1	3	17	5				1			
11					2				3	5	22							
12					1			2	2			4						
13				1	1			2	2			27	1					
14					1			2	2				2					
15	1				2			2	2	1				4				
16					1			2	2						11			
17					1			2	2	1						3		
Total Tallies	3		24	45	178			18	186	33	22		27	4	5		6	1838
Incidents	2		12	28	33			5	35	16	15		5	2	4		3	
Percent of Total	.2		1.3	2.4	80.9			.5	10.1	1.8	1.2		1.5	.2	.3		.3	

Instructor A-3
Class HUMANITIES
Date 4-24-72

MATRIX

TABLE I

CATEGORY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
1	11				11			11	11	1								
2		11			11			11	11									
3			3	1	5			11	11									
4				3	5			3	5	3				1	1			
5				15	13			11	3	1					2			
6					11	11		11	11									
7					11		11	11	11									
8			2		3			11										
9			3	4	5				57	7								
10			3		11			1	4	8				1				
11					11			11	11		111							
12					1			11	11			111						
13					11			11	1				111					
14					11			11	1					111				
15	1				2			11	11					2				
16					11			11	1						111			
17					11			1	9							11		
Total Tallies	2	-	11	33	1384			5	71	20				1	6			1833
Incidents	1		8	20	20			5	14	12				1	4			
Percent of Total	.1		.6	1.8	74.9			.3	3.9	1.1				.1	.3			

Instructor A-4
Class HUMANITIES
Date 4-23-72

MATRIX

TABLE I

CATEGORY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	11				1			2									
2		1	1		1			2									
3		1	5	3	5			1	1				3				
4			1	13	5			3	12	12							
5				15	13			1	1								
6					1	11		2									
7					11		11	2									
8				1	3			11									
9		1	10	5	1			5									
10				4	2			1	4	1							
11					1			1	1		11						
12					1			1	1			11					
13				2	1			1	1	1		5					
14					1			1	1				11				
15					1			1	1					11			
16					1			1	1						4		
17					1			1	1							4	
Total Tallies		2	17	43	129		4	72	29			5					1416
Incidents		2	12	30	16			17	13			3					
Percent of Total		.1	1.2	3	9.1		.3	5.1	2			.4					

Instructor B-1
Class HUMANITIES
Date 4-17-72

MATRIX

TABLE I

CATEGORY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
1	11				4			2										
2		11		1	4			2	3									
3	1		11	1	11			2	2		1							
4	1			14	1			4	4	2								
5		1		5	5			2	3	2	1							
6					1	11		2	2									
7					11		11	2	2									
8		4	2		1			14										
9		4	2	4	3				50									
10				1	1			2	5	2	1							
11					1			1	1	2	11							
12					1			1	2			11						
13					1			2	2				11					
14					1			2	2					11				
15					1			2	2						11			
16					1			2	2							11		
17					1			2	2								11	
Total Tallies	2	10	4	16	895			10	66	8	4							1015
Incidents	2	9	4	12	10			6	16	6	3							
Percent of Total	.2	1.0	.4	1.6	88.2			1.0	6.5	.8	.4							

Instructor B-2
Class HUMANITIES
Date 4-17-72

MATRIX

TABLE I

CATEGORY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
1	1				1			2			1							
2		1		2	1			2										
3			1	3	4			1	1									
4			1	5	4			13	1	5								
5				14	32				2									
6					1	1		1	1									
7					1		1	1	1									
8		3	7	2	4			6										
9					1				8									
10				2	1			2	1	5								
11					1			1	1		2							
12					1			1	1			2						
13					1			1	1				4					
14					1			1	1					2				
15					1			1	1						1			
16					1			1	1							1		
17					1			1	1								1	
Total Tallies	1	3	14	47	1070			21	10	12								1198
Incidents		3	8	23	18			15	2	5								
Percent of Total	.1	.3	1.2	3.9	91			1.8	.8	1.0								

Instructor B-3
Class HUMANITIES
Date 4-19-72

MATRIX

TABLE I

CATEGORY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
1	11				11			11	11									
2		11	1	1	11			11	1									
3			2	1	11			1	1									
4				35	11			14	2	17								
5				23	1111			1	3	1			1					
6					1	11												
7					1		11											
8		2	12	1	7			3										
9		1	1	2	6				25									
10				7	2			8	2	21								
11					1			1	1		11							
12					1			1	-			4						
13					1			1	-				6					
14					1			1	1					4				
15					1			1	-						4			
16					1			1	-							9		
17					1			1	-								9	
Total Tallies	1	3	15	70	149			25	34	64			7					1691
Incidents	1	3	13	35	29			22	9	43								
Percent of Total	.1	.2	.9	4.1	88.4			1.5	2	3.8			.4					

Instructor C-1
Class HUMANITIES
Date 4-25-72

MATRIX

TABLE I

CATEGORY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
1	17				1			1	4									
2	1	16	8		5			1	9	7								
3		1	21		9			1	4									
4			1	27	4			1	6	4	1							
5	1	1	3	6	73			1	8	4	2							
6					1	1		1	1									
7					1		1	1	1									
8			1		1			1										
9	3	57	5	5	2				116	41			1					
10					1			1	50	18		1	1		1			
11					1				4	1	16							
12					1			1			1	16						
13				1	1			1					16					
14					1			1	1					11				
15					1			1	1						1			
16					1			1	1							1		
17					1			1	1								1	
Total Tallies	13	55	39	43	798			1	557	75	10	2	3		1			1912
Incidents	6	59	18	16	75			1	117	57	4	1	2		1			
Percent of Total	.7	3.4	2	2.2	41.7			.1	6.5	3.9	.5	.1	.4		.1			

Table II- Comparison of Matrices of Professors A, B, C

CATEGORY	PROPORTION OF TIME OBSERVED		
	A	B	C
1. Accepts feelings	.07%	.13%	.7%
2. Praises or encourages	.03	.5	3.4
3. Accepts or uses ideas of students	.8	.8	2.0
4. Asks questions	2.75	3.2	2.2
5. Lectures	84.45	89.27	41.7
6. Giving Directions	0	0	0
7. Criticizing or justifying authority	0	0	0
8. Student talk-limited	.33	1.4	.1
9. Student talk-divergent	7.0	3.1	44.8
10. Silence or confusion	1.93	1.87	3.9
11. Encourages class discussion	1.1	.13	.5
12. Invites students to share knowledge or experience	0	0	.1
13. Clarifies thinking by identifying reason for question	1.28	.13	.4
14. Invites criticism of his own ideas	.13	0	0
15. Indicates awareness that class is confused	.2	0	.1
16. Indicates awareness that class is bored	0	0	0
17. Has students apply concepts to demonstrate understanding	.08	0	0

TABLE III STUDENT EVALUATION FORM- MEAN FOR EACH ITEM

ITEM	Professor A n=27	Professor B n=16	Professor C n=8
1	5.45	5.75	6.0
2	4.8	6.25	5.25
3	4.8	5.3	6.37
4	5.65	6.69	5.0
5	5.15	6.44	5.57
6	5.75	6.0	5.5
7	5.65	6.8	6.62
8	5.0	5.94	6.38
9	6.05	6.63	5.75
10	5.3	6.25	4.86
11	4.7	5.69	5.38
12	4.35	6.18	4.71
13	4.6	5.53	5.13
14	5.4	5.56	4.75
15	5.5	6.62	6.0
16	5.5	6.5	5.25
17	5.15	6.12	4.88
18	4.9	5.3	5.38
19	5.55	6.5	6.0
20	5.65	6.88	6.5
21	5.35	6.18	5.38
22	5.45	6.56	6.0
23	4.9	5.87	5.63
24	5.9	6.25	5.38
25	6.0	6.69	5.88
26	4.7	5.69	4.25
27	4.7	6.18	4.63
28	4.9	5.74	4.88
29	5.1	5.87	4.13
30	5.4	5.75	5.57
31	5.6	6.13	5.25
32	5.8	6.69	5.87
33	5.4	6.06	4.33
34	4.8	4.94	5.0
35	6.0	6.56	5.12
36	6.0	6.8	5.25
Mean=	5.4	6.14	5.38

TABLE IV STUDENT EVALUATION ITEMS IN FIVE SCALES

Scale and Item	Professor A	Professor B	Professor C
1. Analytic Synthetic			
1	5.45	5.75	6.0
6	5.75	6.0	5.5
11	4.7	5.7	5.4
16	5.5	6.5	5.3
21	5.35	6.2	5.4
26	4.7	5.7	4.3
30	5.4	5.8	5.6
Means=	5.26	5.94	5.36
2. Organization /Clarity			
2	4.8	6.3	5.25
7	5.65	6.8	6.62
12	4.35	6.2	4.71
17	5.15	6.1	4.88
22	5.45	6.6	6.0
27	4.7	6.2	4.63
31	5.6	6.1	5.25
Means=	5.09	6.32	5.34
3. Instructor Group Interaction			
3	4.8	5.3	6.37
8	5.0	5.9	6.38
13	4.6	5.5	5.13
18	4.9	5.3	5.38
23	4.9	5.9	5.63
28	4.9	5.6	4.88
32*	5.85 *	6.7 *	5.87 *
34	4.8	4.9	5.0
Means=	4.84	5.48	5.54
*Item 32 omitted from means			
4. Instructor Individual Interaction			
4	5.65	6.7	5.0
9	6.05	6.6	5.8
14	5.4	5.6	4.8
19	5.55	6.5	6.0
24	5.9	6.3	5.4
29	5.1	5.9	4.1
35	6.0	6.6	5.1
Means=	5.66	6.31	5.17

TABLE IV STUDENT EVALUATION ITEMS IN FIVE SCALES (cont.)

Scale Item	Professor A	Professor B	Professor C
5. Dynamism/ Enthusiasm			
5	5.15	6.4	5.57
10	5.3	6.3	4.86
15	5.5	6.6	6.0
20	5.65	6.9	6.5
25	6.0	6.7	5.9
33	5.4	6.1	4.3
36	6.0	6.8	5.3
Means=	5.57	6.54	5.5

TABLE V COMPARISON OF MEANS OF HIGHEST SCALE WITH LOWEST FOR PROFESSOR A AND B

Professor A

Interaction Scale		Enthusiasm/Dynamism Scale	
4.8	.0016	5.15	.176
5.0	.0256	5.3	.073
4.6	.0576	5.5	.02
4.9	.0036	5.65	.0035
4.9	.0036	6.0	.1877
4.9	.0036	5.4	.0003
4.8	.0016	6.0	.1877

Mean= 4.84
s^2 = .0138

Mean = 5.57
s^2= .0926

t= 2.239
df = 12
t is significant at .05 level

Professor B

Interaction Scale		Enthusiasm /Dynamism Scale	
5.3	.0324	6.4	.0676
5.9	.176	6.3	.0196
5.5	.0004	6.6	.0576
5.3	.0032	6.9	.0036
5.9	.176	6.7	.1296
5.6	.0144	6.1	.0256
4.9	.336	6.8	.1936

Mean = 5.48
s^2=.1096

Mean = 6.54
s^2= .0796

t = 2.49
df= 12
t is significant at .05 level